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ABSTRACT

Prepared by the American Association of Junior Colleges and the National Council on Medical Technology Education, this guide discusses programs for career-entry supportive medical laboratory personnel which have been cooperatively planned by junior college personnel and the medical community, particularly pathologists and medical technologists. Section 1 provides guidelines for achieving these program development goals: (1) Define the scope of the program, (2) Become aware of program requirements for professional approval, licensure, and certification, (3) Review college philosophy, goals, and orientation in relation to implementation of the program, (4) Evaluate the need for medical laboratory technicians in the community, (5) Evaluate the feasibility of the college offering a program, (6) Obtain program resources and prepare for use, (7) Develop a curriculum, and (8) Evaluate the program. Section 2 describes in checklist form the actions the college administrator, program director, and pathologist should conduct to achieve the goals. Eligibility requirements for certification, reference organizations, reference publications, and laws covering medical laboratories are appended. (SB)

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guide for program planning: medical laboratory technician

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INTRODUCTION

In 1967, a committee representing the National Health Council and the American Association of Junior Colleges published A Guide for Health Technology Program Planning. This represented the culmination of an intensive effort by a large joint committee. The primary purpose of that publication was to present a general guide for health technology program development. It was not intended that the publication address itself to specific health occupations.

Prior to the appearance of the general guide, the American Association of Junior Colleges had accepted an invitation from the National Council on Medical Technology Education to join with it in discussing matters of mutual interest. The discussions were designed to examine the most appropriate contribution of community colleges to the field of laboratory medicine.

The deliberations of the American Association of Junior Colleges-National Council on Medical Technology Education Committee led to a broader understanding of the interests and objectives of community colleges and of professional organizations concerned with laboratory medicine. Junior colleges serve in varying ways to educate personnel for the clinical laboratory. The role of the junior college in providing university transfer curriculums for the medical technologist and the cytotechnologist, as well as supplementary courses for continuing education programs, is widely recognized. However, the establishment of technical-level medical laboratory programs within junior colleges has been slow and difficult. The joint committee concluded that it could best serve the interests of all by publishing guidelines specifically directed to the development of skilled technical workers in laboratory medicine.

The text which follows is designed to complement the pioneering effort which the National Health Council and the American Association of Junior Colleges accomplished through the publication of the general guide. Our task focused upon applying the planning principles of the general guide to the development of programs for medical laboratory technicians.

The American Association of Junior Colleges-National Council on Medical Technology Education Committee has relied upon the support of each of the sponsoring groups.

The Committee is indebted to a number of consultants, but particularly to Esther Freier, M.T. (ASCP), Arch Lugenbeel, Elizabeth Lundgren, M.T. (ASCP) and Colin R. Macpherson, M.D., who worked either with the AAJC-NCMTE Committee or with a subcommittee which developed the scientific content for the teaching-laboratory program.

FOREWORD

This guide represents a significant departure in the field of education for health personnel, for it results from active collaboration between professionals in medicine and in education.

It stems logically from the convergence of two major trends in our society: toward the provision of comprehensive health care on the one hand and, on the other, toward the provision of post-secondary education for all who seek it and are able to qualify.

The latter tendency is most strikingly evident in the recent growth of junior (or community) colleges, typically open to all high school graduates and offering a wide range of programs to meet a multiplicity of demands for higher skills.

The trend in medicine shows itself not only in burgeoning demand for health care and in shortages of personnel in all traditional categories, but also in the emerging need for skills of new kinds and at new levels of competence. In a time characterized by rapid change in all fields, American medicine is no exception.

The medical laboratory stands at the vortex of the economic, technological and social forces which motivate the changes in medical care and its delivery that are now underway.

The professional societies concerned with the provision of medical laboratory services have attempted to anticipate and prepare for some of these changes. It is increasingly evident, however, that many of the problems of change confronting the laboratory will demand new approaches to education. The National Council on Medical Technology Education (NCMTE) was created as the educational arm of the National Committee for Careers in Medical Technology. The Council's membership includes medical technologists and pathologists under the chairmanship of A. Wendell Musser, M.D.

The work of the National Council on Medical Technology Education led to the realization that junior colleges are a major resource for the training of new categories of technical health personnel and that collaborative efforts are desirable. This guide is the result of hard work by a joint committee of the American Association of Junior Colleges and the National Council on Medical Technology Education.

It represents the efforts of all the members of the AAJC-NCMTE Committee, in addition to the staffs of the separate organizations and the outstanding contributions of several consultants. It should be used in conjunction with the excellent pamphlet entitled: "A Guide for Health Technology Program Planning" prepared by the American Association of Junior Colleges and the National Health Council.

We are grateful to the committee members and other contributors for this equally excellent guide.

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● OVERVIEW OF GUIDE

This *Guide* discusses programs for career-entry supportive medical laboratory personnel in which the junior college and the medical community assume cooperative roles as planners of the total educational program. The medical laboratory technician represents a new category of laboratory worker. As defined by the American Society of Clinical Pathologists, this individual is one who has graduated from a two-year community college or has an equivalent education, who will be able to perform more complicated laboratory procedures than the laboratory assistant, and who will require a limited amount of supervision. Medical technologists and other medical technology specialists usually possess at least a baccalaureate degree and emerge as supervisors, teachers, administrators, or scientists performing and developing sophisticated procedures for the medical laboratory. Pathologists are physicians who specialize in laboratory medicine, assume overall responsibility for medical laboratory performance and educational programs, and provide liaison between other physicians and the medical laboratory technical staff.

The emphasis of this *Guide* is upon encouraging the development of educational programs for the medical laboratory technician which have, in their totality, been jointly conceived by pathologists, medical technologists, and the educational community. The focus the educator uses in designing academic programs may be unfamiliar to the medical person who is oriented to clinical training programs. Rather than combining academic requirements with clinical requirements or imposing one orientation in place of the other, the primary purpose of this *Guide* is to provide information which will assist program planners in achieving a synthesis of orientation in the education of medical laboratory personnel. A prerequisite for this is to define responsibilities for planning in such a way that the unique contributions of the educational and medical communities are integrated.

Pathologists and medical technologists have a responsibility to:

1. Define the competencies expected of graduates in such a way that the college personnel will be able to design appropriate learning activities
2. Recommend qualified technologists and pathologists for faculty and advisory roles
3. Assure the quality of the clinical experience which is to be integrated in the total program
4. Provide information about the channel for recognition of graduates and approval of the program by the Council on Medical Education of the American Medical Association
5. Assume an advisory capacity on a continuing basis.

The college staff has a responsibility to:

1. Coordinate the educational process, which includes securing competent faculty as defined by the Council on Medical Education of the American Medical Association

2. Design an educationally sound curriculum by incorporating performance criteria as defined by the medical technologists and pathologists

3. Provide services to the enlarged student body resulting from the addition of a new program, anticipating ratio expectations of state and regional accrediting agencies

4. Analyze the nature of the program so that:

a) the general education, including the sciences, will provide a firm base for the technical portions of the curriculum

b) the appropriate education structure is provided to allow graduates to be licensed by the state, if required, and certified by the American Society of Clinical Pathologists

5. Maintain program flexibility to reflect changes in the utilization of graduates and changes in requirements of approving agencies.

This *Guide* is divided into two sections. Section 1, "Educational Program Development for the Medical Laboratory Technician," (pages 13 to 33) presents and discusses eight goals to be pursued in the process of program development:

Goal One: Definition of the scope of medical laboratory technician programs

Goal Two: Awareness of program requirements for professional approval, licensure, and certification

Goal Three: Review of college philosophy, goals, and organization in relation to the implementation of a program for medical laboratory technicians

Goal Four: Evaluation of the need for medical laboratory technicians and of their probable acceptance in medical laboratories of the community

Goal Five: Evaluation of the feasibility of the college developing and offering a program for the preparation of medical laboratory technicians

Goal Six: Procurement of program resources and preparation for use

Goal Seven: Development of a curriculum for medical laboratory technicians

Goal Eight: Evaluation of the program.

Full exploration of the nature of the college commitment is necessary before initiating a program for the education of medical laboratory technicians. This exploration involves satisfying goals one through five. Within this phase the college administration will depend upon medical laboratory technologists, pathologists, relevant professional associations, and academic accrediting bodies for fact-finding assistance and evaluation of potential resources. If the decision is made to initiate a program for medical laboratory technicians, work proceeds on the second phase of concrete program planning.

Data gathered in phase one will be used as a basis for securing program resources, goal six, and for curriculum development, goal seven. Within this second phase, working relationships with medical consultants are intensified and formalized on a contract basis. The program is initiated and plans are tested, thus beginning work toward the final goal of continuous evaluation and program improvement. At the completion of the discussion section related to each goal, a guideline to achievement of the goal is stated.

Coordination of a broad range of human, technical, and financial resources is required in developing programs for medical laboratory technicians. Within each program phase, medical technologists, pathologists, and the college administration will need to work together. Section 2, "Implementation of Goals," (pages 35 to 48) describes in checklist fashion the action-involvement of the participating groups as they approach the goals discussed in Section 1.

Section 1

EDUCATIONAL PROGRAM DEVELOPMENT FOR THE MEDICAL LABORATORY TECHNICIAN

The purpose of the following sequence of goals is to help two-year colleges achieve a synthesis of medical requirements and educational requirements in their programs for the medical laboratory technician. The procedure outlined within this section is also intended to give help in creating an educational program within which academic and clinical learning experiences coalesce to provide technical-level competencies.

GOAL ONE: Definition of the scope of medical laboratory technician programs

Discussion: The scope of medical laboratory technician educational programs is determined by: (1) the functions to be performed by the technician, (2) the related roles of other medical laboratory personnel, and (3) the nature of technical education.

Functions performed by the medical laboratory technician: The medical laboratory technician is an individual who, through general and technical education, is qualified to perform a high percentage of test procedures on patients. With a junior college education or its equivalent requiring some collegiate science courses, coupled with education in medical laboratory techniques, he prepares himself to learn more complex medical laboratory procedures. Consequently he is capable of working often without immediate supervision in such divisions of the medical laboratory as the blood bank, biochemistry, microbiology, and hematology. He should detect most technical errors, but by training he is not necessarily equipped to resolve them. Likewise, he has not been taught to interpret the meaning of most of his test results, the

identification of micro-organisms, some of the less common antigens and antibodies, and the methods for developing quality control procedures. For these reasons he works under the supervision of a medical technologist (ASCP) and a pathologist. He serves in a very useful supportive role to the medical technologist and the results of his examinations are used by physicians in the diagnosis and treatment of patients.

Another general description of medical laboratory technician functions appears in the Fourth Report of the World Health Organization's Expert Committee on Health Laboratory Services. Issued in 1966, it describes the functions and responsibilities of the various categories of technical laboratory personnel.* The Committee labeled the category of responsibilities approximating that usually assigned to medical laboratory technicians as "Level B." While the W.H.O. outline is by no means a precise detailing of functions, it has the merit of being agreeable, thus providing a starting point for cooperative planning of educational programs.

The teaching-laboratory essentials enumerated on pages 28-32 of this *Guide* are drawn in relation to medical laboratory technician functions and should also be consulted for clarification of role and function.

Related roles: Accepting a role for the medical laboratory technician extends the role of the professional technologist in assigning responsibilities to supportive personnel in the working situation. Definitive work in role relationships and utilization of personnel possessing varying educational background is needed. It is clear, however, that the medical laboratory technician and the certified laboratory assistant work under the supervision of the medical technologist, the pathologist, or a physician in medical practice. The role of the medical laboratory technician is affected by the staffing patterns in the medical laboratory. These patterns are changing and differ greatly according to laboratory size and location. (See Proceedings of October 1967 Conference of Government and the Professions, *Manpower for the Medical Laboratory,* for discussion of existing and projected patterns.)

Role as a product of technical-level education: The functions expected of the medical laboratory technician require competencies which in general aspect are shared with others who possess technical-level education: competency in

*World Health Organization Technical Report Series, #345, *The Training of Health Laboratory Personnel (Technical Staff)*, Geneva, 1966, pp. 7-8. (May be obtained from Columbia University Press, International Documents Service, 2960 Broadway, New York, New York 10027.)

(a) application of principles; (b) effective use of materials, equipment, and processes; (c) skill in communication; and (d) effective rapport with the professional laboratory staff and nontechnical laboratory personnel. Technical education is not confined to any set of disciplines or prescribed courses of study; rather, the term connotes a level of instruction which does not conflict with occupational education programs or with longer professional programs. Technical education extends educational opportunity in an attempt to meet the personnel requirements of laboratory medicine and provide educational mobility.

GUIDELINE: *Definitive statements on the scope of medical laboratory technician duties are still evolving. However, it is necessary to establish a procedure for designing programs within junior colleges which will take into account currently operative medical laboratory roles, accepted functions, and the competencies expected of products of technical level programs.*

GOAL TWO: Awareness of program requirements for professional approval, licensure, and certification

Discussion: The performance standards in the medical laboratory field must be considered in detail because the focus of the technical program and responsibilities of graduates will be determined by these standards. It is necessary that the college inform itself about the program standards to be maintained; it is equally necessary, if a program for the medical laboratory technician is initiated, that the college exercise responsibility in informing students of the requirements for licensure and for certification.

Institutional accreditation and program approval: It is important to realize that educational programs for laboratory personnel involve a dual system. Six regional accrediting agencies are recognized as the official accrediting groups for *institutions* while the Council on Medical Education of the American Medical Association is the approving group for *program* recognition.

Institutional accreditation: Regional accreditation of the institution gives evidence of quality for the academic standards maintained by the college. However, when a junior college assumes administrative and planning responsibility for the education of clinical laboratory personnel, its coordinating responsibilities include maintenance of professional requirements through the

Council on Medical Education of the American Medical Association to the point of gaining program approvals.

Even though one major development in the near future may be to handle institutional accreditation and program approval concurrently, the dimensions of responsibility of the respective groups will remain essentially the same. For example, it has been the recommendation of the National Commission on Accrediting that regional accreditation and program approval be undertaken concurrently, but that specified professional groups be designated to provide the regional associations with program approval guidelines and a list of professional personnel qualified to examine programs.

Colleges which seek special program approval in addition to institutional accreditation would be wise to apply for such only if the evaluating agency is approved by the National Commission on Accrediting.

Program approval: The function of providing program approval establishes standards which protect the public and serve potential employers. When federal financial support is considered for institutions and students, these program approvals are usually prerequisites.

The professional group, recognized as the agency for the approval of medical programs in which programs for laboratory personnel are included, is the Council on Medical Education of the American Medical Association. In collaboration with representatives of the professional specialty, the Council on Medical Education establishes minimum requirements concerning programs, faculty, and facilities. Representatives of the Council on Medical Education do not inspect programs; this is done by the Board of Schools of the American Society of Clinical Pathologists. Approval of programs is then given by the Council on Medical Education upon the recommendation of the Board of Schools. The Board of Schools is comprised of representatives from the American Society of Medical Technologists and the American Society of Clinical Pathologists.

The responsibility of medical technologists and pathologists involved in planning individual programs is to guide college personnel through the proper channel for program approval. The pathologists and technologists must be able to translate and discriminate differences even when a one-year certificate program for assistants and an associate degree program for technicians are operating in the same junior college.

Licensure: Licensure varies with statutory requirements. It is a legal action which assures the protection of the public by determining whether or not the person licensed has achieved a *minimum* standard of performance. Licensure does not exist in every state. In some states licensure applies to laboratories as well as to personnel. Because the status of licensure regulations is extremely variable, the Appendix includes only the most recently available information (see Appendix, page 48). By the time a given college might be considering a program, the situation may be changed. Check all statutory requirements at the time of program initiation because licensure of medical laboratories under state or federal laws may be contingent, among other things, upon the educational background of the incumbent laboratory personnel.

Certification: Professional recognition is given through certification of the individual. The Registry of Medical Technologists (ASCP) is recognized as the only authoritative qualifying body in this field by the American Medical Association, American Hospital Association, Catholic Hospital Association, American College of Physicians, etc. The Board of Registry consists of six members of the American Society of Clinical Pathologists and five members of the American Society of Medical Technologists. The office of the Registry is conducted by the registrar appointed by the Board. Certification is given to individuals meeting specified educational and, in some cases, experience requirements, who pass the

examination given by official examiners under the Board's auspices. Basic requirements of eligibility for examination to obtain certification of the medical laboratory technician can be fulfilled by satisfactory completion of an associate degree program which includes approved clinical training. (See Appendix, pages 46-47, for requirements of related medical laboratory personnel.)

GUIDELINE: *In order to provide full access into the career and allow for additional educational development, programs should provide the necessary background for national professional recognition which includes: (1) accreditation for the educational institution through the regional accrediting agency; (2) approval for the program provided through the Council on Medical Education of the American Medical Association; (3) certification of graduates provided through the Registry of the American Society of Clinical Pathologists; and (4) licensure by the appropriate legal bodies where required. It is the recommendation of this committee that junior colleges work closely with pathologists and medical technologists to establish sound approaches to the education of supportive laboratory personnel. In new and developing programs, close working relationships will allow operationally effective approaches to become the standard for approval.*

GOAL THREE: Review of college philosophy, goals, and organization in relation to the implementation of a program for medical laboratory technicians

Discussion: Can the college meet the standards which are now operational for medical laboratory personnel programs? Can the college meet these standards, which emphasize extensive clinical experience accompanied by low student-instructor ratios, and maintain a responsible administration of the program? Can the college maintain its philosophy of integrated academic and clinical programs which build cohesively toward common goals of increased student adequacy? Would other goals of the college be impaired by the monetary investment necessary to maintain the program for medical laboratory technicians? Can the faculty system of academic rank and requirements for teaching be sufficiently flexible to accommodate the personnel needed for an integrated academic and clinical program for medical laboratory technicians?

The above questions have undoubtedly been in the college administrator's mind while he proceeded toward goals one and two. Some of the answers may

have been reached earlier. Whenever conclusions are made, however, they need to be based upon careful factual consideration rather than upon surmise. To assure this, it is recommended that close consultation be arranged with pathologists and medical technologists. It is also recommended that some members of the college administration visit existing programs and determine firsthand the unique qualities of these programs.

This is the time for exploring the dimensions of medical group responsibility and college responsibility. When college personnel try to define medical practice and medical groups attempt to dictate college policy, it is a misuse of energy to continue planning. Instead, attention must be directed to the functions of the total educational program and to ways to implement the integration of clinical and academic segments. Such integration eventually strengthens both interests.

Conclusions can be drawn about the ability of the college to meet requirements only after close consultation with professional groups responsible for them. For example, the hourly requirement for clinical practice and the clinical instructor to student ratio in the clinical area can be satisfied in a number of ways. When a junior college provides evidence that the essential functions of education for medical laboratory personnel are being established under appropriate medical auspices, exact numbers are of minimal importance. The clinical instructor to student ratio is an index of how well the medical laboratory affiliate supports educational quality in the clinical staff.

One of the areas which frequently becomes difficult of discussion and decision in terms of the philosophy of the college is the utilization of affiliated faculty from the clinical agencies. The basis for this difficulty appears to be a rigid interpretation of the factors involved when a college assumes direct responsibility for all portions of the program. If the junior college cannot provide qualified clinical faculty from its own staff, then the clinical teaching responsibility falls upon affiliated faculty from the clinical agency. The nature of activity in the medical laboratory requires the presence of a laboratory staff which continues clinical services and at the same time performs teaching functions. The function of direct responsibility by the college can be provided through sponsorship of an in-service program for clinical staff members who will be involved in training students. This program would include orientation to program planning, college policies, and teaching techniques; in addition, the medical technologist assigned as program director would designate specific responsibilities to the affiliate faculty. College campus faculty personnel are in daily contact with the clinical area but are not necessarily supervising individual students. With the cooperation of the administration in the clinical agency, the

affiliate faculty in the clinical agency may be compensated by the college for the time spent in teaching and program planning. Essentially, the affiliate faculty will be medical technologists or pathologists who teach selected areas and are directly responsible to the college while performing these specific responsibilities.

Another aspect of planning which may become difficult in terms of the philosophy of the college is that the "program" director has traditionally been a pathologist. When a pathologist is appointed as "clinical" director for the program in the junior college, this function is covered. While the pathologist does not assume administrative responsibility for the program under this arrangement, he does advise the college administration on medical aspects of the program, assures the quality of the clinical laboratories, and acts as ambassador for the program in the medical community. The pathologists as clinical directors and the medical technologists acting as program directors are key persons in establishing channels for communication with the clinical affiliates and other community agencies.

GUIDELINE: *The philosophy of the college should be reviewed with the representatives of the medical groups with focus on the function of the college and on the function of the program requirements.*

DECISION POINT — INTEREST OR LACK OF INTEREST IN DEVELOPING A PROGRAM FOR MEDICAL LABORATORY TECHNICIANS

GOAL FOUR: Evaluation of the need for medical laboratory technicians and of their probable acceptance in medical laboratories of the community

Discussion: The need for a program for medical laboratory technicians is dependent upon local and national laboratory personnel needs. In addition to conducting surveys for immediate answers in the local community and region, numerous other sources may be used to obtain information of a numerical nature. The college administration is responsible for evaluating such information and for decision about such questions as: (a) Is there a local or regional need for this manpower? (b) Is it probable that job opportunities will persist? Numerical projections involved in reaching decision need to take into account the literature on proposed laboratory growth and change.

There are, however, other than numerical considerations necessary at this time. Registered medical technologists may need help in learning to make maximal use of new technical-level personnel. Program planning and curriculum development should consider extending educational opportunities for previously trained career people through continuing education programs, short-term programs, etc. The college is considering an investment in personnel and equipment which warrants attention to such extended planning in relation to its commitment to individual student needs as well as to community needs.

When considering the college commitment to student needs, returning military service personnel present a challenge. Those trained as laboratory personnel by the services frequently desire an associate degree with the option of admission to examination by the medical certifying agencies. It is not realistic to expect these persons to complete an entire two-year program. Conversely, it is not realistic to expect the college to accept the previous laboratory training at face value. Evaluation of previous training is the responsibility of the college. In response to the challenge presented by military service personnel, program design may involve establishing equivalency and proficiency evaluation systems so that the college may be secure in recommending the graduate of a "special" program to the certifying agency for examination. It is important to emphasize that when the college assumes administration of any medical program the responsibility for the level of performance of the graduate has automatically become the domain of the college. When a short-term or special program is considered, the same responsibility exists: the college assures the certifying agency that this person is ready for examination as a career person.

GUIDELINE: *Multiple sources and multiple approaches should be considered when determining the need for a medical laboratory technician program. Sources should be local, regional, and national in scope. Approaches should include consideration of related needs of military service personnel and others trained in some phases of medical laboratory work but not now qualified for professional recognition as medical laboratory technicians. Approaches should also include consideration of the needs of medical technologists for continuing education experiences in order to make maximal use of the new technical-level personnel. When need is established, the total college programming in this field will reflect the uniqueness of each situation. When the college assumes administration of the program, personnel will be fully cognizant of the responsibility vested in the educational institution.*

GOAL FIVE: Evaluation of the feasibility of the college developing and offering a program for the preparation of medical laboratory technicians

Discussion: Within prior goals, much information for making this evaluation has been gathered. This goal is distinct from earlier goals in that it culminates in the final decision about sponsorship of a program for medical laboratory technicians. In order to make this decision, curriculum projections need to move to a level of specificity. (Consult pages 27 to 33.) The research done by advisory committees needs to be brought together. Plans for clinical affiliation must progress to the point of obtaining specific evaluations of available laboratories by pathologists and medical technologists who have been acting as program advisors. In other words, it is necessary to now determine whether facilities, general college resources, personnel, students, and finances are all available in sufficient quantity to begin a program of quality.

The experience of the NCMTE-AAJC Committee leads to the following admonitions:

1. Unless adequate on-campus facilities *and* adequate clinical (hospital or independent medical laboratory) facilities are available, do not start a program. Use medical advisors and educational advisors freely at this point in making assessments. See pages 24 and 26 for essentials of a clinical facility.
2. Search widely for a competent program director and teaching staff with representatives of the medical groups assuming a major role in the identification of qualified personnel. The program director must possess appropriate qualification in the medical laboratory speciality. The minimal requirement is that he be a registered medical technologist with a baccalaureate degree. In addition, he must meet whatever college and state educational system requirements are operational. Securing the services of a medical technologist who is also a qualified educator may require considerable time and energy; planning time, therefore, has been known to extend for two or three years. Some compromise may be effected if a medical technologist in the community, prepared to pursue a formal program in a field related to education, will begin that course and concurrently participate in planning for the junior college program.
3. Know your financial resources. Financial requirements of the program in terms of equipment, facilities, and supplies require detailed analysis. The cost of teaching facilities for a medical laboratory technician program makes this one of the most expensive programs of the college. Facility needs will vary from institution to institution, and will depend upon the instructional plan.

GUIDELINE: *Total investigation of the program should include particular emphasis on the financial requirements of the program, with a director or coordinator employed to assume responsibility for the program well in advance of the initiation date. As always, the functions dictate the strategies used and varied approaches may be employed to establish the program. Examples of these include (1) using a qualified person in the community and the advisory committee to assist in planning, and (2) using space and some equipment on a loan or rental basis until the campus facility is complete.*

DECISION POINT — COLLEGE WILL OR WILL NOT SPONSOR A PROGRAM FOR MEDICAL LABORATORY TECHNICIANS

GOAL SIX: Procurement of program resources and preparation for use

Discussion: Needed program resources have been projected in relation to other goals; the general outline of the curriculum has also been completed. It has previously been stated that securing the human resources is the first order of business. The leadership of the full-time, college-appointed director is then available to follow through on earlier plans: purchasing equipment; making final contractual arrangements with laboratories; designing and equipping campus teaching laboratories; acting as general liaison between the new program, the rest of the college, and the clinical facilities. Because the teaching laboratory will be dealt with under goal seven, no elaboration is made here. However, the leadership function of the program director, as well as some of the additional program resources which need to be "readied" for use, can be illustrated:

1. Seminars or other educational sessions, for the affiliate faculty of the clinical setting and for affiliated college campus faculty, are necessary prior to the inauguration of a program. The purpose of such seminars is to prepare affiliate personnel for the integration of new duties with their existing work loads. Seminars can also build awareness of the employment goals of students in this program, program objectives, and the contributions of affiliate faculty which will be necessary for program success. Such preparation of affiliate personnel is the responsibility of the program director.

2. To attain goal six, final contractual arrangements must be made with medical laboratories. Effective clinical practice depends upon the adequacy of the clinical facility, which ought to have a variety of qualities. It should be directed by a pathologist certified by the American Board of Pathology, and he should be assisted by sufficient professional staff, including medical technologists, to permit adequate time for teaching the students as well as for discharge of all other professional responsibilities. Whatever service or research duties might be, there should be satisfactory evidence that there is time plus a desire to teach these students. A student body of ten or more should be encouraged; there should be an instructor, preferably employed by the junior college, to coordinate the studies of students in the affiliated medical laboratory. A sufficiently broad range of laboratory procedures should be performed to provide the breadth of training desired. Ample space for student practice work should be available in the service areas, in a physically separate laboratory, or preferably in both places. The first location offers the bench-side type of experience, while the second provides a site which permits the student to practice in a didactic type of setting. Study areas and ready access to an ample medical laboratory library are essential. Clinical laboratory requirements can

be summarized as: (a) adequate space, (b) volume and variety of work adequate to provide the educational experiences identified, and (c) enough personnel available in the laboratory unit to carry on teaching without jeopardizing the service aspect of the laboratory, and vice versa.

3. The program director needs to become thoroughly familiar with campus procedures, the goals of other programs, the general nature of the student body and the physical and human resources already available on the campus. Preprogram contacts prepare the way for future cooperation of personnel and may also reveal equipment, space, and talents which could be shared to avoid needless duplication of effort.

GUIDELINE: *Firm commitments regarding resources must be made. The program director must be employed to give leadership in resolving problems of facility and equipment needs, finding additional faculty, arranging seminars or other educational sessions for affiliated faculty.*

GOAL SEVEN: Development of a curriculum for medical laboratory technicians which

- . . . specifies learning experiences in appropriate detail
- . . . balances out and coordinates general education and technical education
- . . . resolves potential conflicts between job-entry demands and junior college general education requirements
- . . . specifies the type and sequence of learning activities to support the objectives of the program and the nature of the content
- . . . defines course goals as student competencies in order to permit evaluation
- . . . coordinates clinical experience with general education and technical courses
- . . . provides for appropriate spacing of student practice at the clinical facility
- . . . utilizes technological implementation of instructional methods to make teaching increasingly efficient and effective
- . . . continuously attempts to improve evaluation measures

Discussion: The program director plans the curriculum in cooperation with the college administration and the advisory committee. The detailed design of the curriculum is the responsibility of the full-time college faculty person, a medical technologist with at least a baccalaureate degree who has been employed as the program director.

General: All planning of content must be preceded by a complete definition of what the graduate will be able to do upon graduation. It is important to consider this a domain of individual program planners and to recognize that the requirements of any regulatory or certifying body do not fulfill this aspect of educational planning. From a functional point of view requirements of these agencies are incorporated as baselines for curriculum planning, not as maximum expectations or as focal points of the program. An imperative consideration is that all well-managed medical laboratories maintain in-service orientation programs for new employees. The junior college program is responsible for educating a competent technical worker, but orientation to minute specifics of preferred methods is the responsibility of the employer of the graduate.

Programs for the medical laboratory technician have three interrelated segments: general education, teaching-laboratory segments in medical labora-

tory technology, and clinical practice. The degree to which interrelation of the segments is achieved depends upon the coordinating ability of the program director. Coordination is achieved by building upon the knowledge of program requirements which pathologists, medical technologists, and general education faculty have gained in earlier planning phases.

The general education segment: This designation refers to the program segment which consists of courses in English, history, and the social sciences, as well as courses in science and mathematics which are more directly related to medical laboratory functions. Because of the heavy reliance of medical laboratory work upon chemistry, other related sciences, and mathematics, the general education segment within programs for medical laboratory technicians often constitutes approximately two-thirds of the total program.

Special chemistry, mathematics, or general science courses should be constructed only if these courses are not now provided on the campus. Common elements in the requirements for other technical programs should be investigated, combining faculty energies when possible, with all supportive academic classes maintained at an acceptable level but focused to suit specific program objectives.

Teaching-laboratory and clinical-laboratory segments: These combined segments constitute approximately one-third of the total program for medical laboratory technicians. There should be no sharp dividing line between the general education and the laboratory segments. Proficiency in medical laboratory technique is the end result of the total program. Early introduction to health careers, for example, is seen as important in all health-related programs and yet would be difficult to classify as being a portion of either segment. Specialty courses in medical laboratory technique would include the following general content: (a) ethics, (b) employee-employer relations, (c) quality control, (d) record keeping, and (e) specimen identification. While some of these areas are presented in general education courses, such things as quality control are also taught as an integral part of each of the laboratory activities suggested as the teaching-laboratory curriculum and consistently practiced in the clinical laboratory.

The teaching laboratory: This designation refers to courses taught in the teaching laboratory which may be located on the college campus, in an affiliated hospital, or in both facilities. Program coordination is dependent upon the teaching-laboratory segment of medical laboratory techniques. The planning of courses within this segment is crucial because their content and methodology

must build upon the general education foundation (particularly in appropriate mathematics and science) and at the same time build into clinical practice. This flow, with the teaching laboratory segment acting as the fulcrum, is necessary without regard for the time placement of clinical practice. The full-time college-appointed program director must assume leadership in translating for the college and for medical groups the unique requirements of teaching laboratories.

The college or hospital-based laboratory for teaching is not in competition with the clinical laboratory and will not require duplicative systems. A principle is often clearer when highly automated equipment is not involved. For instance, knowledge gained in the use of simpler systems can increase recognition of the basic processes which have been automated, thus leading to more responsible use of highly automated equipment.

The teaching-laboratory segment of the program is made up of those courses usually labeled "medical laboratory technique." Wherever the teaching laboratory is located, the focus is on *understanding* procedures rather than on practice. The teaching laboratory is distinct from the clinical laboratory which maintains a service function while students are learning. The teaching laboratory has *no* responsibilities for patient service.

In the chart which follows, areas of recommended teaching laboratory experience are expressed in terms of categories of procedures which have widespread application throughout the country. Within each category specific tests are listed which can be used to illustrate the principles involved but it is not intended that this listing should limit the range or number of tests presented in any given program. The chart also lists suggested limitations on performance in terms of what can reasonably be expected of the associate degree graduate at the time of career entry. The schema presented utilizes classical divisions of laboratory activity and specifies certain miscellaneous screening and emergency procedures which do not fit into these classical divisions but are nevertheless in common usage. The suggested content is based upon the concept that mastery of the principles involved can be achieved in the teaching laboratory through a thorough understanding of one procedure in each category. The clinical-laboratory experience, which is an integral part of the program, will then augment the teaching-laboratory experience by providing additional practice with procedures involving the same principles. The chart of specific content for the teaching-laboratory program is intended as a guide for designing teaching-laboratory experiences.

CONTENT FOR TECHNICAL PROGRAM

Categories of Procedures	Examples of Specific Tests	Limitations of Performance
Students would be expected to learn thoroughly at least one procedure in each category.	The tests listed can be used to illustrate the principles involved in the categories of procedures, but the listing is not intended to limit the range or number taught in any given program.	Examples of what reasonably *cannot* be expected of the associate degree graduate at career entry.
QUALITY CONTROL (applies to all categories below)	Recognize irregularities and refer to supervisor.	Initiation, selection, and evaluation of quality control procedure.
1. CHEMISTRY		
a. Gravimetric	Preparation of standard solutions	1. Development and evaluation of new procedures
b. Titrimetric	Chloride	2. Anything beyond routine cleaning and maintenance of equipment
c. Colorimetric	Glucose or BUN	3. Trouble shooting procedures
d. Spectrophotometric		4. Interpretation
(1) Visible	LDH	
(2) Ultraviolet	Barbiturate	
(3) Flame		
(a) Emission	Sodium or Potassium	
(b) Absorption	Calcium	
e. Automation	Glucose or BUN	
f. Electrophoretic	Serum or Hemoglobin	
g. Potentiometric	Blood pH or gases	
h. Microtechnic	Bilirubin	
2. HEMATOLOGY		
a. Cell counts manual automated	Leukocyte or erythrocyte count	
b. Peripheral blood cell morphology	Differential counting with recognition that atypical and abnormal cells are present	Identification of atypical and abnormal cells
(1) Obtaining specimen	Venipuncture or finger stick	
(2) Preparation of smear	Slide or cover slip	
(3) Staining of smear	Wright	

Categories of Procedures	Examples of Specific Tests	Limitations of Performance
HEMATOLOGY *(continued)*		
c. Hemoglobinometry	Preparation of standard curves	
d. Macroscopic observation	Hematocrit or ESR	
e. Indices	MCH, MCV and MCHC with application of quality control	Interpretation of Indices
f. Body fluids (other than urine)	Spinal or serous cavity fluid	Identification of atypical and abnormal cells
g. Coagulation	Lee White or PT	
3. URINALYSIS		
a. Routine	Physical, chemical and morphological study	Interpretation
b. Other	PSP	
4. BLOOD BANKING		
a. Grouping and typing	ABO and Rh	Phenotyping, genotyping
b. Compatibility testing	Anti-Human globulin technic	Should not be *allowed* to take responsibility for deviation from standard technic
c. Antibody screening	Enzyme technic with report of positive findings to supervisor	Identification of antibodies
d. Component preparation	Packed red cells	Full range of component preparation
e. Donor selection	History	Evaluation of donor acceptability for venisection
f. Transfusion reaction investigation	Repetition of a and b with post-reaction specimen	Interpretation
5. SEROLOGY		
a. Precipitation	ASO	Interpretation
b. Agglutination	Febrile agglutinins or latex procedures	
c. Flocculation	VDRL	
d. Complement fixation	Reiter or viral antigen	

CONTENT FOR TECHNICAL PROGRAM (CONT.)

Categories of Procedures	Examples of Specific Tests	Limitations of Performance
6. MICROBIOLOGY		
a. Bacteriology and mycology		
(1) General aseptic technic	Specimen handling	Development of technics for handling specimens or application of standard technics to unusual specimens
(2) Media preparation	Blood agar	Selection of quality control procedures
(3) Direct smear	Gram stain	
(4) Specimen inoculation		
(a) Initial	Urine (applies routine procedure)	Selection of media or conditions for primary inoculation
(b) Subculture	Selection of single colony	Identification of organism or selection of media for subculture
(5) Anaerobic cultures	Brewer jar	
(6) Microaerophilic cultures	Candle jar	
(7) Antibiotic susceptibility testing	Disc	1) Tube dilution technics 2) Selection of disc concentration
(8) Colony counting	Pour plates or surface	
b. Parasitology		
Specimen processing	Flotation	Identification
7. MISCELLANEOUS SCREENING AND EMERGENCY		
a. Dip stick	Urines	Interpretation
b. Occult blood	Feces	
c. Emergency screening toxicology	Phenothiazine	Quantitation
d. Pregnancy testing	Immunologic	Interpretation
e. Electrocardiogram	Standard leads	

The clinical laboratory: The sequencing of practice in the clinical laboratory varies, but decision rests upon the objectives of the program; clinical-laboratory practice may be concurrent with teaching-laboratory experiences, or may take place at the completion of the teaching-laboratory segment. When teaching-laboratory courses in medical laboratory technique are structured to include skill practice, multiple class contact hours are usually required for a single unit of credit, with local option determining the precise ratio. Arrangements such as these can only be successful if there is careful planning with the clinical director, a pathologist who has accepted responsibility for assuring the quality of the clinical experience. Assignments to the clinical faculty, however, are determined by the *program* director with the advice of the pathologist. (See pages 39-40 for detailed listing of pathologist responsibilities.)

The clinical-practice segment takes place in the laboratory of the affiliated hospitals or in the affiliated independent laboratory or laboratories. Within this segment the student works under careful supervision in the service setting. The learning experiences of each student during the clinical practice segment are under the direction of the college and are planned jointly by college and clinical laboratory personnel. It is possible that service needs in one laboratory may not provide a sufficient range of student practice. In such cases, the college would arrange for more than one laboratory to be utilized as a student completes this practice segment of the program.

GUIDELINE: *The teaching laboratory builds upon a foundation of general education and builds into clinical laboratory practice. The teaching laboratory concentrates upon key procedures to the point of student mastery of the principles involved; within the clinical laboratory the student applies these principles as he practices a wide variety of procedures. The goal is skilled performance of functions which are understood. The curriculum is also designed to help a student recognize that there are tasks which his education has not prepared him to perform at career entry.*

GOAL EIGHT: Evaluation of the program, which determines

- . . . to what extent students perform satisfactorily at the point of career entry
- . . . to what extent students demonstrate the personal maturity demanded by the occupation
- . . . to what extent the program is producing the competencies designated as program objectives
- . . . how employers evaluate the competencies of program graduates
- . . . to what extent the program is turning out sufficient numbers of qualified supportive personnel in medical laboratory technology

- ... to what extent the resources of the junior college, neighboring educational institutions (colleges, universities), practitioner associations, facilities, state and federal agencies, and foundations have been utilized
- ... how projections of need have been updated
- ... to what extent employers are using technician-level graduates appropriately and completely
- ... to what extent the number of qualified applicants to the program has increased
- ... to what extent the graduates of the program have shown evidence of good working relationships with other kinds of personnel
- ... to what extent medical laboratory technicians are remaining in the field or seeking advanced education in medical technology

Discussion: Methods for obtaining answers to these questions may be as simple as maintaining complete records on graduates through follow-up studies, with letters forwarded on an annual basis. It is desirable to utilize fully the existing evaluation system of the college, as well as tailoring some evaluation for this particular program.

GUIDELINE: *The exact structure to be used for evaluation of the program should be specified during the initial planning of the program.*

Section 2

IMPLEMENTATION OF GOALS

Implementation of the goals listed in Section One may be achieved in a variety of ways. Each method, however, must of necessity be based upon the participation of representatives of the college, of medical technologists, and of pathologists. Section One stressed the combined responsibilities of these participants. Section Two emphasizes the things each type of participant can do to produce successful educational programs for medical laboratory technicians.

College administration: The college administration will often initiate concern for an added program which could meet health personnel needs in the community. Many colleges have ongoing programs in some of the other health technologies, in which instance a coordinator of health-related programs is probably a member of the college administrative staff. The term *college administration* is used to designate either top administration or its representatives.

Administrative concern for efficient and appropriate use of planning time is uppermost. The following checklist is one type of procedure which accents gradually intensified investigation prior to making the decision to sponsor a program for medical laboratory technicians:

Step One: Preliminary consideration of a program to be made in cooperation with representatives of community groups and other knowledgeable resource persons, specifically including selected medical technologists and pathologists. Medical representatives might be identified by approaching the local or state

society of the medical technologists and/or pathologists. Purpose of preliminary consideration is to gather the following types of information:

1. Status of medical laboratories (hospital and independent laboratories) in the geographical area served by the college
2. Requirements established by sponsoring professional groups and state and federal regulation
3. Unique aspects of the proposed program and aspects shared with other technical programs
4. General estimates of cost
5. Current state and national developments in existing educational programs for laboratory personnel
6. Community resources for locating instructors
7. Speculative information about community or area need for the graduate
8. Gross estimate of anticipated student interest and enrollment.

Step Two: Establish an advisory committee* or consult with any standing committees already formed for programs in health technologies.

Step Three: Visit existing programs and determine firsthand the unique qualities of these programs.

Step Four: Conduct a comprehensive survey to determine: (a) geographical areas to be served; (b) employment demand; (c) supply of potentially interested students.

Steps Two, Three, and Four may be undertaken concurrently; when completed, proceed to Step Five if decision is to sponsor the program.

Step Five: Basic program and facility planning should be implemented in cooperation with the advisory committee and consultants. The first medical technologist should be employed on the faculty, if possible. If this is not possible immediately, a medical technologist should be employed on a consultative basis. The basic planning of this stage should include:

1. Preparation of written statements of the general purposes and aims of the program
2. Preparation of an outline delineating general subject areas to be included in the program
3. Preparation of detailed evaluation of existing physical facilities and development of recommendations for additional facilities with cost estimates
4. Preparation of proposed equipment lists, including cost figures; final draft will be subject to changes and suggestions made by medical technologist employed as director

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*American Association of Junior Colleges, *On Using and Being a Consultant*, Washington, D.C., 1967, pp. 1-34.

5. Determination of number of teachers needed and preparation of written statement of qualifications, with estimate of salaries required
6. Preparation of proposed budget and determination of financial support for establishing and maintaining the program
7. Orientation of college faculty to proposed program
8. Preparation of detailed outline for program evaluation and written statement of time this evaluation will be initiated
9. Appointment of a pathologist as medical advisor with support from local medical association
10. Preparation and execution of written agreements with cooperating agencies such as hospitals and independent medical laboratories.

Step Six: Employ a competent director or coordinator if not done in Step Five. Temporary appointment of a full-time person as director may need to be utilized. This should be done six to twelve months before the program is started.

The medical technologist as program director: Under the most favorable conditions, the medical technologist appointed as program director would have participated in early planning of the program. The medical technologist should seek at least six to twelve months lead time before actually starting the program. This is the minimal time needed to accomplish the following:

1. Guide completion of the program facility
2. Review proposed equipment list and assist with installation when equipment is received
3. Develop instructional materials and complete the detailed curriculum, including written statement of student evaluation procedures
4. Initiate in-service program for affiliate faculty at least six months prior to the opening of the program
5. Assist in student recruitment and student selection
6. Assist in promoting the program through various channels such as news media
7. Initiate program.

Continuing responsibilities of the program director who is a full-time member of the college faculty include:

8. Initiating program evaluation procedures and making changes which may be indicated on a continuing basis
9. Continuing contacts with the program advisory committee
10. Coordination of campus and clinical teaching.

Other medical technologists may act on advisory committees to junior college programs, and are usually aware of current thinking on requirements, variation in laboratory structure and staffing, and act as employed program consultants. They often act as liaison between college and recruitment facilities and participate as an affiliate of the college, supervising students in their clinical work.

The pathologist: The pathologist is involved in each phase of program development. In planning phases he acts as a member of the local advisory committee of the community college, and assists and advises in the:

1. Establishment of community need for various types of clinical laboratory personnel
2. Development of appropriate curriculum
3. Preparation of contractual agreements between the community college and clinical facility
4. Arrangement of the clinical laboratory training facility within his own or other local laboratories or in a separate facility provided by the community college, through
   a. Providing advice and assistance in design of the clinical facility
   b. Providing assistance in the purchase of appropriate equipment and supplies
5. Identification and recommendation of teaching personnel.

As a member of a state or regional advisory committee, he assists and advises in coordination of state or regional community college programs and evaluation of the need for and caliber of state or regional community college programs.

In the ongoing program phase the pathologist participates in training programs in the community college as a member of the faculty or as an authoritative medical advisor through:

1. Providing student and faculty orientation to the laboratory environment
2. Basic course teaching
3. Evaluation and counseling of students and in placement of graduating students.

In future program planning the pathologist participates in ongoing evaluation of the educational program in terms of:

1. Fulfillment of community need
2. The need for curriculum revision
3. The development of facilities for teacher training.

APPENDICES

APPENDIX A

Eligibility Requirements For Examination To Obtain Certification

Medical technologist — three years of college with sixteen semester hours each of approved chemistry and biology courses and one course in mathematics, plus a twelve-month course at an AMA-Approved School of Medical Technology.

Cytotechnologist — two years of college with twelve semester hours in science, eight of these in biology, plus one year of training under an AMA-Approved School of Cytotechnology, with the last six months at the school or at an acceptable cytology laboratory.

Medical laboratory technician — completion of an associate degree program, including approved clinical training.

Certified laboratory assistant — high school graduation and twelve-month training course in AMA-Approved Laboratory Assistants School.

Histologic technician — limited certificate following one year of training in pathology laboratory for high school graduate, plus written and practical examination. Two-year program requirements are now in preparation.

Nuclear medicine technologist — AMA-approved programs provide for two levels, junior college and baccalaureate.

APPENDIX B
Reference Organizations

Professional

American Association of
Junior Colleges
1315 16th Street N.W.
Washington, D.C. 20036

American Hospital Association
840 North Lake Shore Drive
Chicago, Illinois 60611

American Medical Association
Council on Medical Education
Department of Allied Medical
Professions and Services
535 North Dearborn Street
Chicago, Illinois 60610

American Society of Clinical
Pathologists
710 South Wolcott Avenue
Chicago, Illinois 60612

American Society of Medical
Technologists
Suite 1600 Hermann Professional
Building
Houston, Texas 77025

Board of Schools — ASCP
710 South Wolcott Avenue
Chicago, Illinois 60612

College of American Pathologists
230 N. Michigan Avenue
Chicago, Illinois 60601

National Commission on Accrediting
1785 Massachusetts Avenue N.W.
Washington, D.C. 20036

National Committee for Careers in
Medical Technology
9650 Rockville Pike
Bethesda, Maryland 20014

National Council on Medical
Technology Education
9650 Rockville Pike
Bethesda, Maryland 20014

National Science Foundation
Office of Associate Director
(Education)
1800 G Street N.W.
Washington, D.C. 20006

Registry of Medical Technologists
(ASCP)
P.O. Box 2544
Muncie, Indiana 47302

Government

U.S. Employment Service
Department of Labor
Washington, D.C. 20210
(and all state offices of the
U.S. Employment Service)

U.S. Office of Education
Health Occupations Section
Division of Vocational and Technical
Education
Washington, D.C. 20202

U.S. Office of Education
Division of Accreditation and
Institutional Eligibility
Bureau of Higher Education
Washington, D.C. 20202

U.S. Public Health Service
Public Inquiries Branch
Office of Information
Washington, D.C. 20201

APPENDIX C
Reference Publications

Health Statistics and Surveys

American Hospital Association. *Manpower Resources in Hospitals — 1966.* Chicago, Illinois: The Association, 1966.

U.S. Department of Health, Education, and Welfare. National Center for Health Statistics. *Health Manpower — United States, 1965-1967.* PHS Publication No. 1000, Series 14, No. 1. Washington, D.C.: Government Printing Office.

U.S. Department of Health, Education, and Welfare. National Center for Health Statistics. *Health Resources Statistics, 1968.* PHS Publication No. 1509. Washington, D.C.: Government Printing Office.

U.S. Department of Labor. *Occupational Outlook Handbook, 1968-69 Ed.* Bulletin No. 1550. Washington, D.C.: Government Printing Office.

State Information: Check local or state agencies such as hospital councils, State Department of Health, etc. Several examples of types of agencies and studies are: Arizona Health Services Education Association. *Projected Training Needs for Health Service Occupations.* Phoenix, Arizona: The Association, 1966.

Employment Security Commission of North Carolina, Bureau of Employment Security Research. *Study of Manpower and Training Needs for Medical and Health Service Occupations.* Raleigh, N.C.: The Commission, 1967.

Hospital Council of Maryland, Inc. *Manpower in Maryland's Hospitals; Report and Recommendations on a Growing Crisis.* Baltimore, Md.: The Council, July 1966.

Indiana State Employment Service, Indiana Employment Security Division. *Manpower Requirements in Indiana Hospitals.* Indianapolis, Ind.: State Empolyment Service, June 1967.

Northeastern University, Bureau of Business and Economic Research. *Study of Paramedical Personnel Shortages in Boston Metropolitan Area.* Boston, Mass.: Northeastern University, 1967.

South Carolina Employment Security Commission. *Manpower Requirements for Health Facilities in South Carolina.* Columbia, S.C.: The Commission, March 1966.

State Department of Education, Division of Vocational Education, and Labor Education Center. *Health Service Occupations, 1971-1976.* Storrs, Conn.: University of Connecticut, 1967.

State of Louisiana Vocational Curriculum Development and Research Center, in cooperation with Research and Statistics Unit, Employment Security Division, Louisiana Department of Labor. *Louisiana Study of Manpower and Training Needs, 1966.* Baton Rouge, La.: Department of Labor, 1966.

Certification and Licensure

Forgotson, Edward H., and Roemer, Ruth. "Government Licensure and Voluntary Standards for Health Personnel and Facilities: Their Power and Limitation in Assuring High-Quality Health Care," *Medical Care,* VI, No. 5 (September-October, 1968), 345-54.

U.S. Department of Health, Education and Welfare, National Center for Health Statistics. *State Licensing of Health Occupations.* PHS Publication No. 1758. Washington, D.C.: Government Printing Office.

Technical

Campus Safety Association. *Laboratory Design* (handling of biological materials). National Safety Council, Chicago, Illinois.

State Department of Education, Tallahassee, Florida. *Safety in Science Laboratories.* Bulletin No. 74. 1968.

U.S. Department of Health, Education, and Welfare, National Institutes of Health, Safety Office. *Chemical and Biological Safety Guide.* Washington, D.C.: Government Printing Office, 1965.

Education

American Association of Junior Colleges. *Extending Campus Resources.* Washington, D.C.: The Association, 1968.

American Association of Junior Colleges. *Emphasis: Occupational Education in the Two-Year College.* Washington, D.C.: The Association, 1966.

Kinsinger, Robert E. *Education for Health Technicians — An Overview.* Report to the American Association of Junior Colleges, Secondary Education. Washington, D.C.: American Association of Junior Colleges, 1966.

National Health Council — American Association of Junior Colleges. *A Guide for Health Technology Program Planning.* Washington, D.C.: American Association of Junior Colleges, 1967.

U.S. Department of Health, Education, and Welfare. *Education for the Allied Health Professions and Services.* PHS Publication No. 1600. Washington, D.C.: U.S. Government Printing Office, 1967.

U.S. Department of Health, Education, and Welfare. *Criteria for Technician Education.* A Suggested Guide, Office of Education publication, Washington, D.C.: U.S. Government Printing Office, 1968.

Manpower

U.S. Department of Health, Education, and Welfare. *Health Manpower Perspective: 1967*. PHS Publication No. 1667. Washington, D.C.: U.S. Government Printing Office, 1967.

U.S. Department of Health, Education, and Welfare. *Manpower for the Medical Laboratory*. A Report of a Conference of Government and the Professions, Sponsored by the National Committee for Careers in Medical Technology. PHS Publication No. 1771. Washington, D.C.: U.S. Government Printing Office, 1967.

APPENDIX D

Criteria for Certification of Medical Laboratory Technicians — MLT (ASCP)

The following criteria have been developed by an Ad Hoc Committee of the American Society of Clinical Pathologists (ASCP), composed of pathologists and medical technologists, and later approved by the ASCP Board of Directors. The criteria are subject to further refinement and revision. In particular, the mechanics and procedures of a two-year equivalency examination are yet to be worked out.

I. Individuals with an associate degree from an institution having a clinical affiliation with a laboratory approved by the Board of Schools of the ASCP are eligible providing:

A. They possess an associate degree granted by an accredited institution. The curriculum leading to this degree may be one of the following:

1. A structured program in medical laboratory sciences

2. A program that includes courses in chemistry and biology

3. An experimental program acceptable to the Board of Schools of the ASCP.

B. An adequate period of supervised clinical experience in a physician-directed laboratory approved by the Board of Schools of ASCP. This period may be part of or follow the degree program, and may be implemented in a number of ways relative to the educational needs of the institution.

II. Individuals who are presently Certified Laboratory Assistants:

A. Will be eligible for examination providing:

1. They possess or acquire an associate degree, or

2. They demonstrate comparable academic standing as measured by a two-year college equivalency examination.

B. Certified Laboratory Assistants, who as of July 1, 1969, possess an associate degree or have 60 semester hours or 90 quarter hours of college credit may upon application be classified as a Medical Laboratory Technician without examination.

III. Graduates of military medical laboratory programs totalling no less than twelve months duration will be eligible for examination as a Medical Laboratory Technician by fulfilling one of the following requirements:

A. Possess or acquire an associate degree, or

B. Demonstrate comparable academic standing as measured by a two-year college equivalency examination.

IV. Individuals with an associate degree but lacking supervised clinical experience in a physician-directed laboratory approved by the ASCP Board of Schools may become eligible for examination as a Medical Laboratory Technician if:

A. They possess an associate degree or establish equivalent academic standing and

1. Have had a twelve months structured curriculum in medical laboratory techniques, which may have been incorporated in their collegiate courses, plus,

2. One year of experience in a physician-directed laboratory acceptable to the ASCP Board of Schools.

B. They hold an associate degree plus five years of experience in a physician-directed laboratory acceptable to the ASCP Board of Schools.

APPENDIX E

Laws or Regulations Covering Medical Laboratories

State	Labs Covered: Private	Labs Covered: Hospital	Licensure or Registration of Labs Required	M.D. Supervision Required	Personnel Governed by Law or Regulation: Director	Supervisor	Technician/ Technologist	Trainee	Personnel License or Certificate of Qualification Required	Pending Legislation
Alabama							X (1)		yes (1)	X
Arizona	X	X (12)			X			X (12)		
California	X	X	yes		X		X	X	yes	X
Colorado										X
Connecticut	X		yes		X					
Delaware	X		yes (2)	X	X					
D.C.	X	X		X (3)						
Florida	X	X	yes		X	X	X	X	yes	
Hawaii			(4)		X		X		yes	
Illinois	X	X	yes		X	X	X	X		
Iowa	X	X		X (3)						X
Kentucky	X		yes		X	X	X			
Louisiana	X	X		X (3)						
Maine	X	X	yes	X (5)	X				yes (5)	
Maryland	X	X	yes		X		X			
Massachusetts	X			X (6)						X
Michigan	X	X								
Missouri										X
Nevada	X	X	yes		X		X			
N. Hampshire	X	X		X (3)						X
New Jersey	X		yes		X		X (7)		yes	X
New York	X	X	yes		X				yes	X
New York City	X	X	yes		X	X	X	X	yes	
Ohio										X
Oklahoma										X
Oregon	X	X	yes (8)							X
Pennsylvania	X		yes		X	X	X	X	(11)	
Rhode Island	X		yes		X					
Tennessee	X	X	yes		X	X	X	X	yes	
Texas	X	X		X (3)						
Vermont	X	X	yes (9)							
Wisconsin										X
Puerto Rico	X	X	yes		X		X (10)		yes	

1. Alabama has a voluntary certification program for technologists, but does not regulate laboratories.
2. Delaware state Board of Health has "official regulations governing the establishment and operation of medical or clinical laboratories" which involves approval, not licensure.
3. Laboratory operation in the District of Columbia, Iowa, Louisiana, New Hampshire, and Texas is considered practice of medicine.
4. Hawaii requires licensure of all laboratory personnel, but not laboratories themselves.
5. Maine law requires that labs be operated by physicians, except for non-physicians who meet the "grandfather" conditions.
6. Massachusetts has a limited voluntary laboratory approval program; in practice, certification applications are required to be signed by a licensed physician.
7. New Jersey has a Bio-Analytical Laboratory and Laboratory Act. Separate law requires licensure of public health laboratory technicians employed by local health departments.
8. Oregon requires annual registration, but does not license labs.
9. New regulation of State Board of Health requires annual registration and information on education of director. Laboratories must report change of address or director.
10. Puerto Rico has a separate law licensing technicians, in addition to the law requiring laboratories to be licensed.
11. Pennsylvania does not require personnel to be licensed but may require an examination.
12. Arizona 1969 law exempts licensed hospitals. However, licensed hospitals must meet same standards set for other labs. Qualifications may be set for personnel.
13. Proposed legislation in Kansas, Montana, New York, and Utah has been defeated or otherwise quashed.

This summary has been prepared with the assistance of Anna Fagelson, J.D., Chairman of the Legislation Committee of the American Society of Medical Technologists. It is accurate as of May 1, 1969.